

Figure D5. Basic UHF One-Way or Two-Way Service Contour Data.

Elevations Used: 100, 200, 500, 1000, 2000, 5000 ft.
 30.5, 61.0, 152.4, 304.8, 609.6, 1524 meters

ERP's Used: 50, 100, 250, 500, 750, 1000, 3500 watts.

Matrix of Carey 39 dBu Service Contour Distances (km):

$$\text{US} = \begin{bmatrix} 11.909 & 14.806 & 20.439 & 26.232 & 32.992 & 44.579 \\ 13.679 & 16.898 & 23.175 & 29.612 & 36.854 & 49.89 \\ 15.933 & 19.795 & 27.198 & 34.44 & 42.809 & 57.454 \\ 18.025 & 22.531 & 30.578 & 38.463 & 47.959 & 63.73 \\ 19.312 & 23.979 & 32.67 & 41.038 & 51.177 & 67.593 \\ 20.278 & 25.267 & 34.279 & 42.97 & 53.43 & 70.168 \\ 25.106 & 31.382 & 42.165 & 52.626 & 64.535 & 82.399 \end{bmatrix} \quad \begin{matrix} \text{E} \\ \text{R} \\ \text{P} \\ | \end{matrix}$$

Error Matrix for points in above matrix:

'Formula calculated distance' - 'Carey Service Contour Distance' (km):

$$E = \begin{bmatrix} 0.326 & 0.577 & 0.368 & -0.115 & -0.275 & -0.81 \\ 0.09 & 0.411 & 0.229 & -0.247 & -0.098 & -0.828 \\ 0.153 & 0.42 & 0.119 & -0.189 & 0.014 & -0.473 \\ 0.051 & 0.176 & 0.085 & -0.045 & 0.022 & -0.054 \\ 0.026 & 0.303 & 0.101 & -0.003 & 0.032 & 0.25 \\ -0.001 & 0.183 & 0.048 & -0.007 & 0.149 & 0.717 \\ -0.435 & -0.533 & -0.771 & -1.04 & -0.52 & 1.558 \end{bmatrix}$$

A row by row plot of these errors is presented in Fig. D4.

Standard Deviation of Above Errors: $\sigma = 2.9$ km

Error Matrix -- FCC Proposed Equation:

'FCC equation distance' - 'Carey Service Contour Distance' (km):

$$\text{EFCC} = \begin{bmatrix} -0.281 & 0.015 & -0.014 & -0.2 & 0.189 & 1.147 \\ -0.506 & -0.108 & -0.036 & -0.12 & 0.735 & 1.912 \\ -0.397 & 0.006 & 0.09 & 0.34 & 1.521 & 3.637 \\ -0.424 & -0.098 & 0.337 & 0.939 & 2.262 & 5.478 \\ -0.379 & 0.152 & 0.585 & 1.347 & 2.846 & 6.856 \\ -0.339 & 0.147 & 0.743 & 1.668 & 3.464 & 8.238 \\ -0.123 & 0.46 & 1.716 & 3.303 & 6.75 & 15.839 \end{bmatrix}$$

Standard Deviation of errors for FCC Proposed Equation:

$$\sigma_{\text{FCC}} = 22.569 \text{ km}$$

Figure D6. Proposed UHF One-Way or Two-Way Mobile Interference Formula

The following formula has been developed for calculating UHF One-Way or Two-Way Mobile Interference Contour Distances:

$$d=8.991 \times h^{0.227} \times p^{0.164 - 0.0000165 \times h} \quad h < 150 \text{ meters}$$

$$d=5.069 \times h^{0.341} \times p^{0.164 - 0.0000165 \times h} \quad h \geq 150 \text{ meters}$$

where

d is the radial distance in kilometers

h is the radial antenna HAAT in meters

p is the radial ERP in watts

Figure D7 contains a series of plots of the proposed formula.

Figure D8 contains a series of plots of the Carey Interference Contour (without the 3 dB/Octave height correction).

Figure D9 contains a series of plots of the Carey Interference Contour (with the 3 dB/Octave height correction).

Figure D10 contains a series of plots of the Carey Interference Contour (50/50 weighted average of the Interf Contour w & w/o 3 dB/Octave height correction).

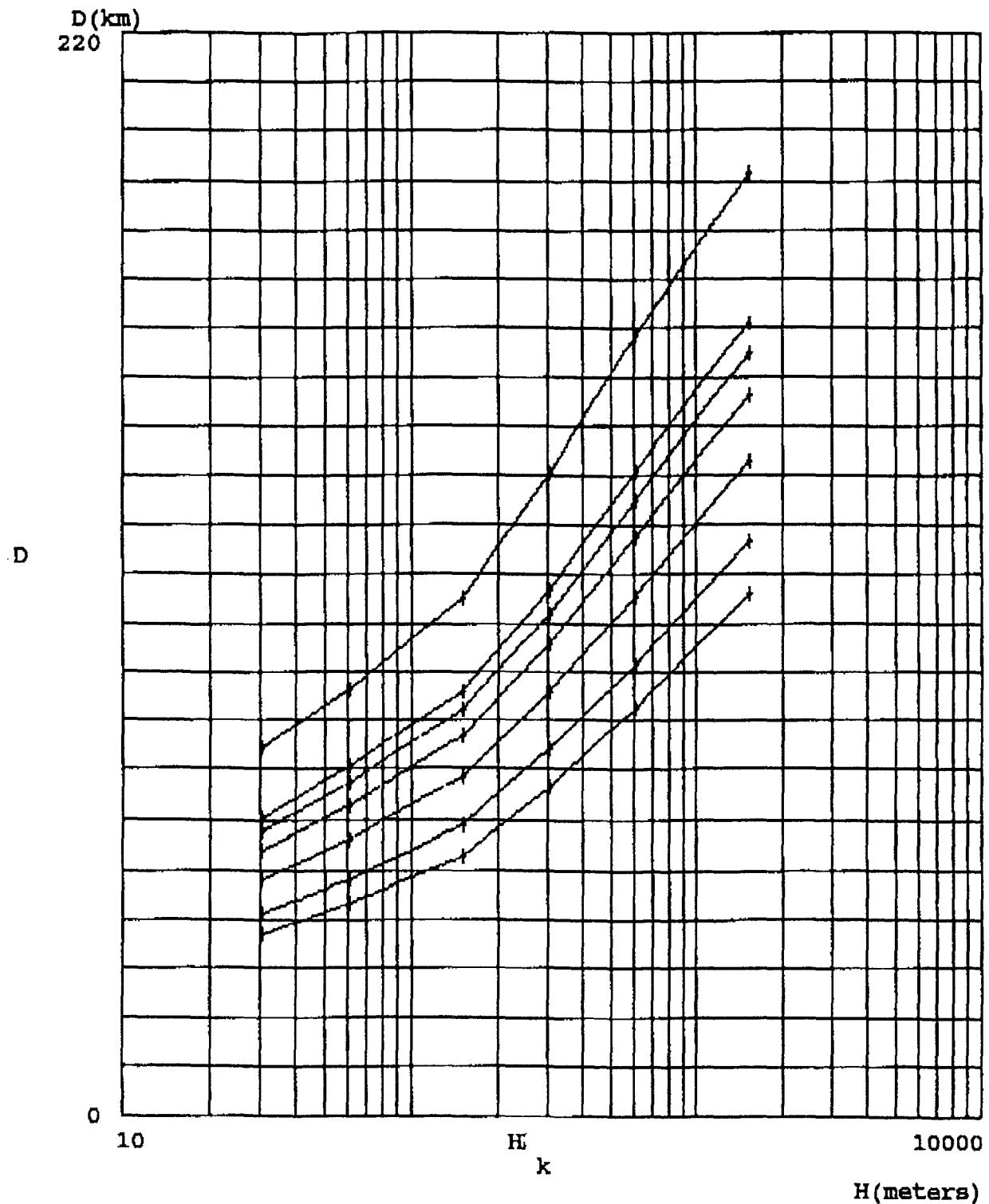
Figure D11 contains a series of plots of the differences between the proposed formula results and the Carey Interference Contour for heights up to 500'.

Figure D12 contains listings of the Carey Interference Contour data, errors, and relevant results. Errors for the FCC Proposed equation are also listed. The equations used for these calculations were:

$$d=9.471 \times h^{0.23} \times p^{0.15} \quad h < 150 \text{ meters}$$

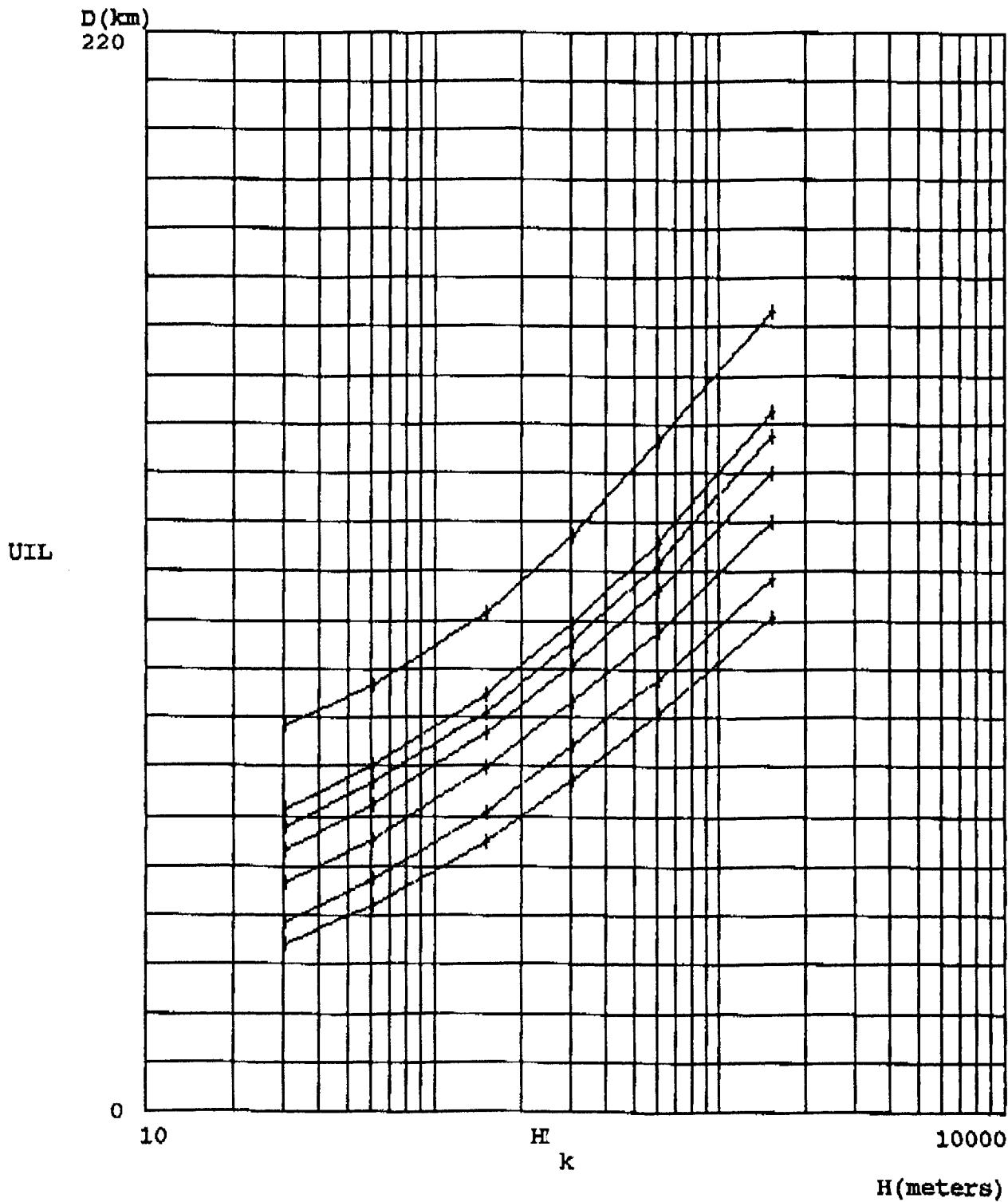
$$d=6.336 \times h^{0.31} \times p^{0.15} \quad h \geq 150 \text{ meters}$$

Figure D7. UHF MOBILE INTERFERENCE CONTOUR DISTANCES



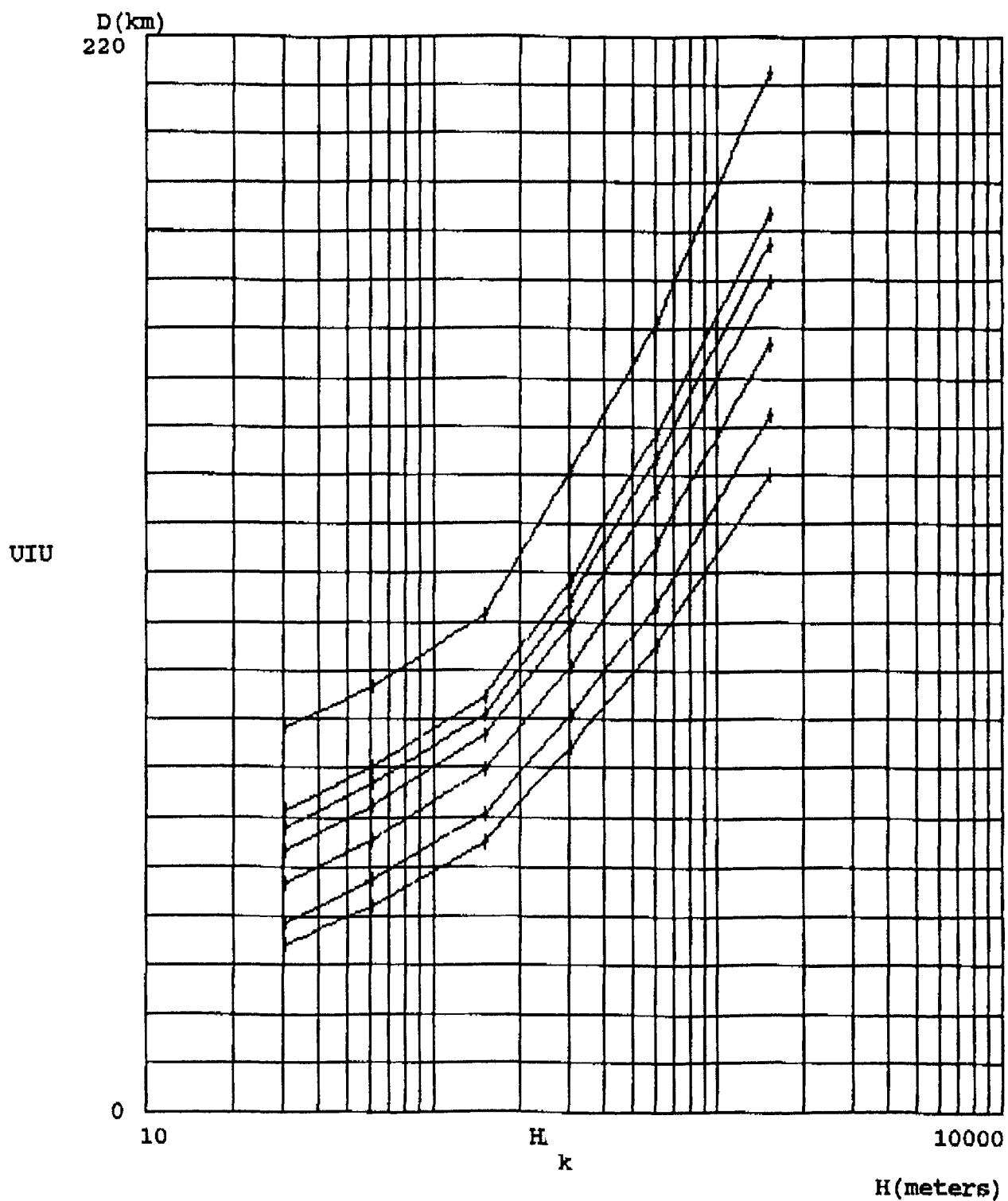
UHF One-Way or Two-Way Mobile Interference Contour Distances
as calculated from proposed formula as a function of Height
for ERP's of 50, 100, 250, 500, 750, 1000, 3500 watts.

Figure D8. UHF MOBILE CAREY INTERFERENCE CONTOUR DISTANCES



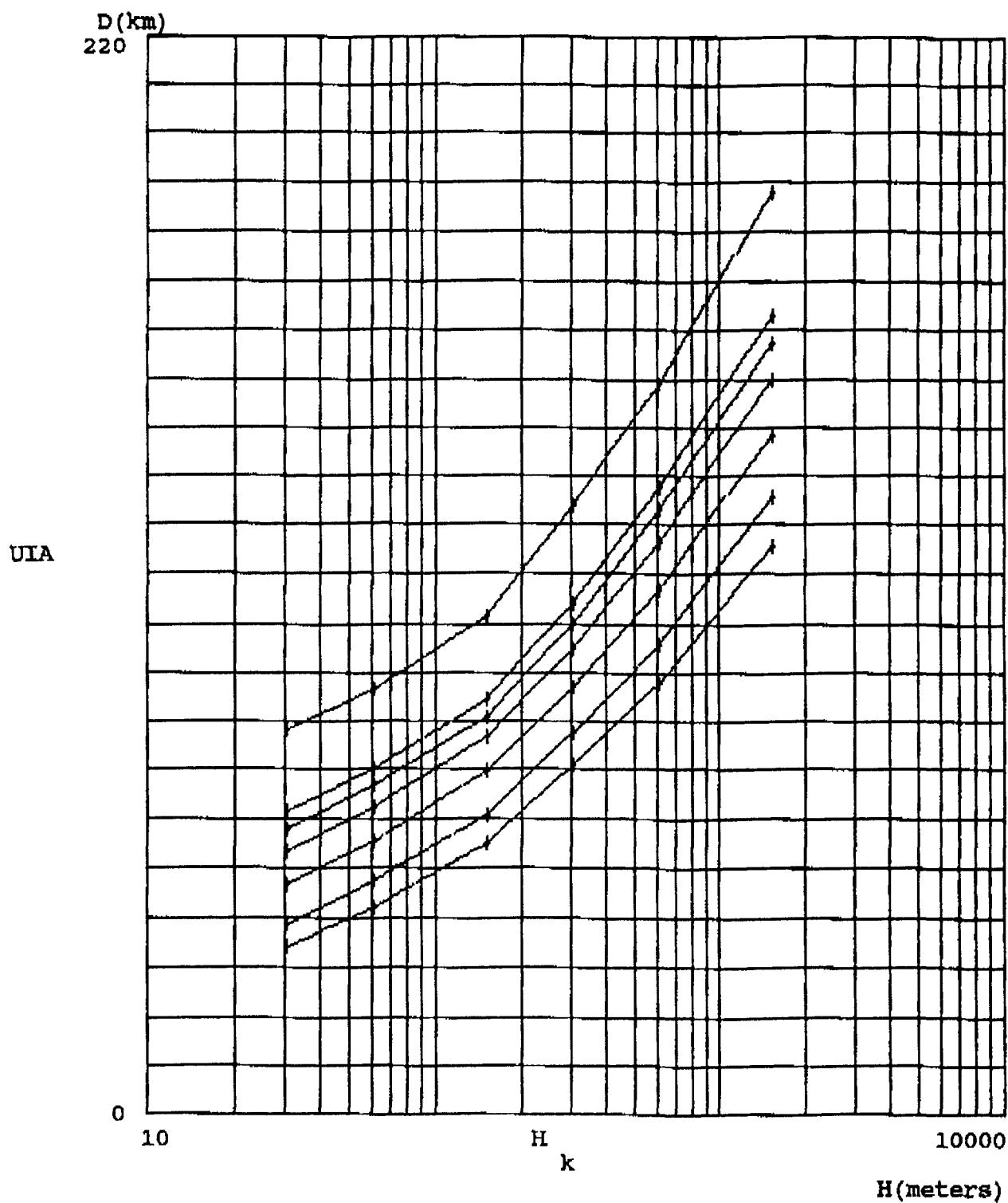
UHF One-Way or Two-Way Carey Interference Contour Distances
(without additional 3 dB/octave height correction
above 500') as a function of Height for ERP's of
50, 100, 250, 500, 750, 1000, 3500 watts.

Figure D9. UHF MOBILE CAREY INTERFERENCE CONTOUR DISTANCES



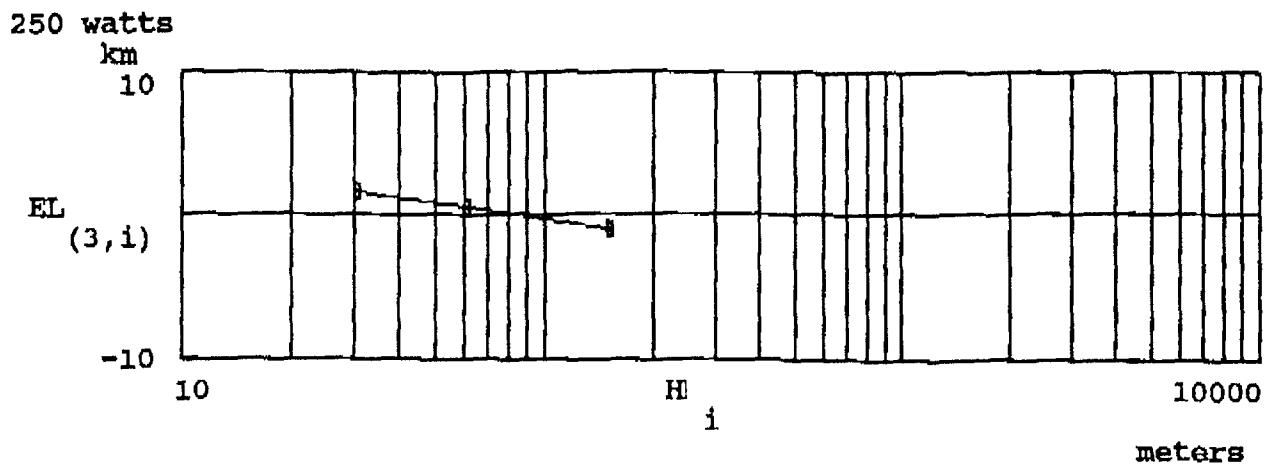
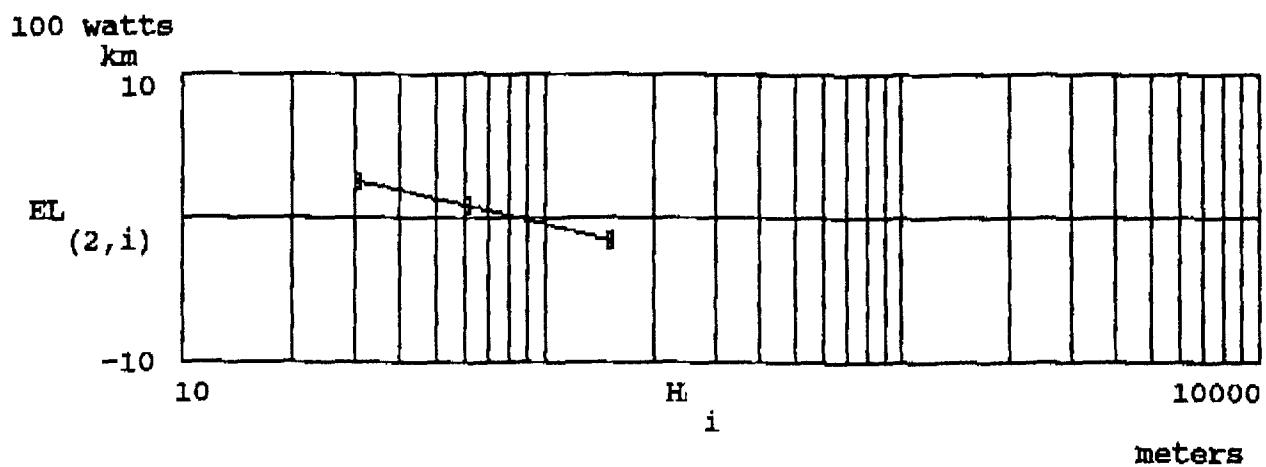
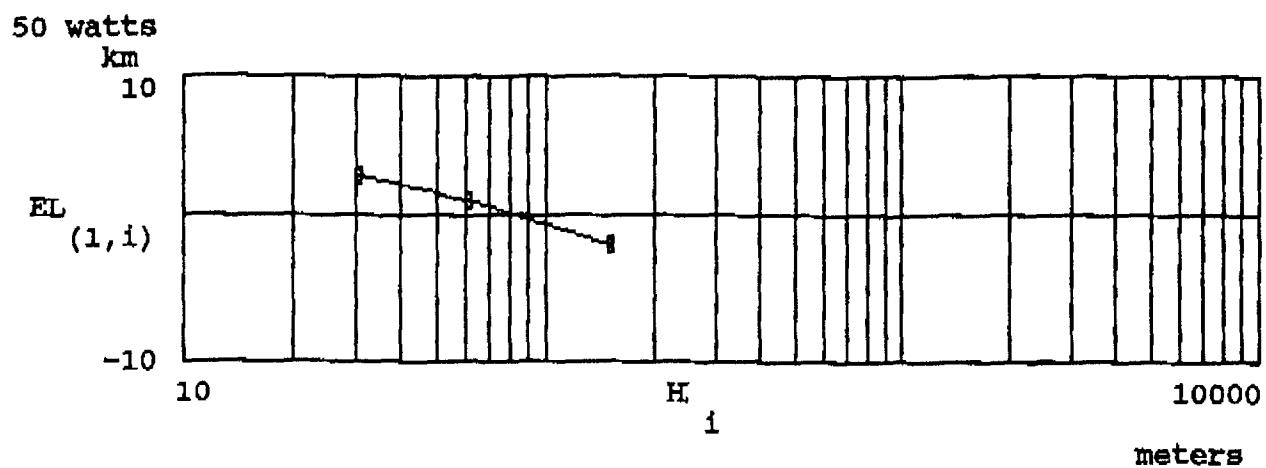
UHF One-Way or Two-Way Carey Interference Contour Distances
(with additional 3 dB/octave height correction
above 500') as a function of Height for ERP's of
50, 100, 250, 500, 75, 1000, 3500 watts.

Figure D10. UHF MOBILE CAREY INTERFERENCE CONTOUR DISTANCES



UHF One-Way or Two-Way Carey Interference Contour Distances
(50/50 weighted average w & w/o additional 3 dB/octave
height correction above 500') as a function of Height
for ERP's of 50, 100, 250, 500, 750, 1000, 3500 watts.

Figure D11. PLOTS of 'Formula Distance' - 'Carey Interf. Contour Distance' as a function of height up to 500' for various ERP's.



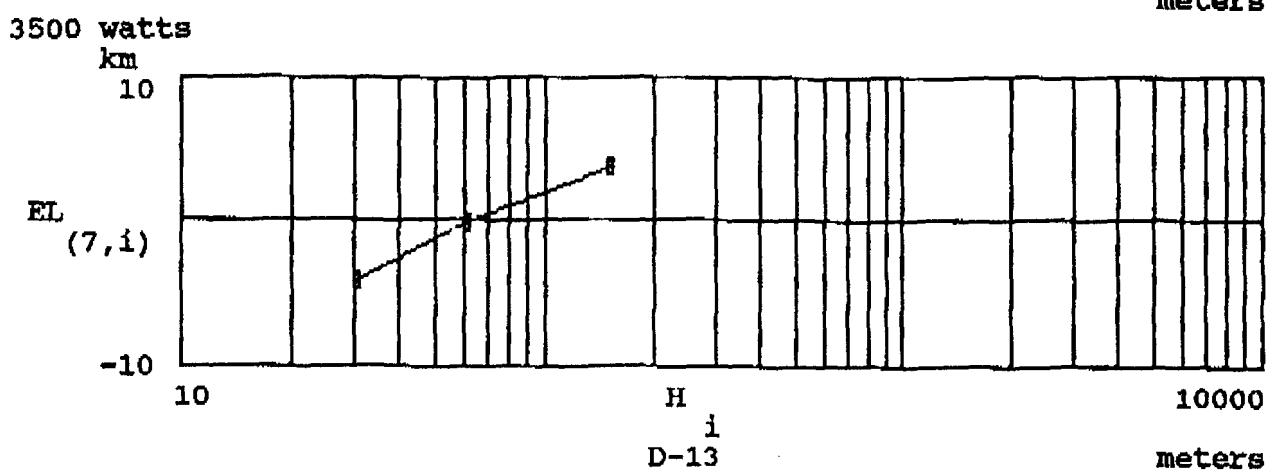
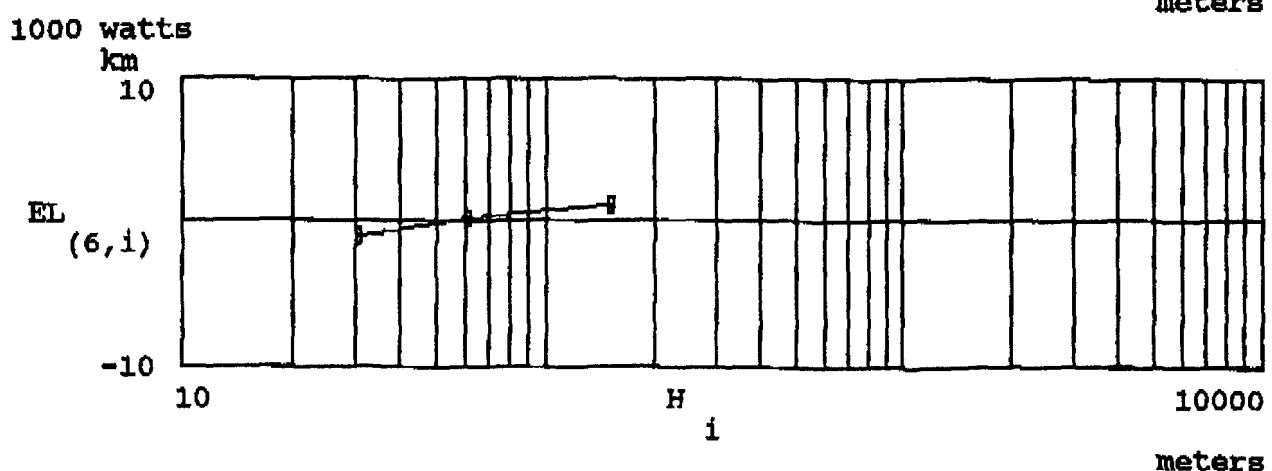
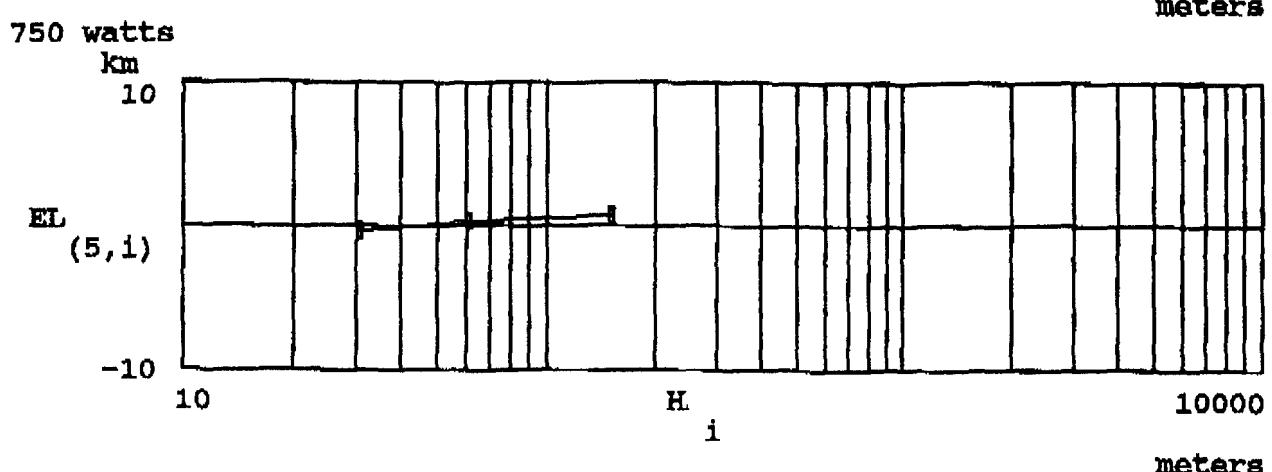
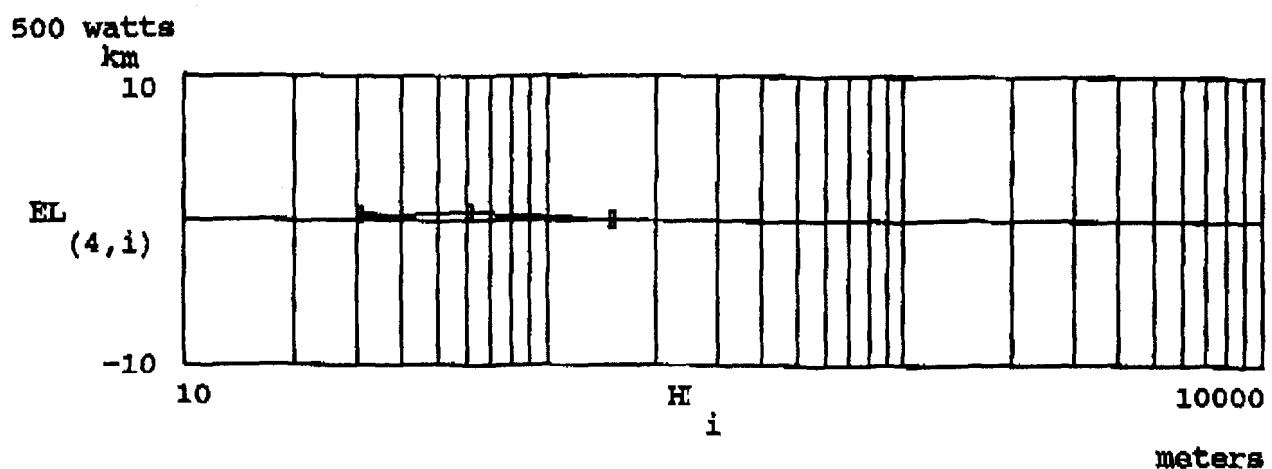


Figure D12. Basic UHF One-Way or Two-Way Interference Contour Data.

Elevations Used: 100, 200, 500, 1000, 2000, 5000 ft.
30.5, 61.0, 152.4, 304.8, 609.6, 1524 meters

ERP's Used: 50, 100, 250, 500, 750, 1000, 3500 watts

Matrix of Carey Interference Contour Distances (km)
up to 500' elevation:

Elevation→

$$UL = \begin{bmatrix} 34.118 & 42.165 & 54.879 \\ 38.946 & 47.476 & 60.672 \\ 46.51 & 55.522 & 69.685 \\ 53.43 & 62.282 & 76.766 \\ 57.936 & 66.788 & 81.111 \\ 61.316 & 70.168 & 84.652 \\ 78.375 & 86.583 & 101.389 \end{bmatrix}$$

E
R
P
↓

Matrix of Carey Interference Contour Distances (km)
without 3 dB/Octave correction above 500' elevation:

$$IL = \begin{bmatrix} 67.432 & 80.789 & 100.584 \\ 74.191 & 87.87 & 108.631 \\ 83.203 & 98.009 & 120.218 \\ 90.928 & 106.378 & 130.035 \\ 95.756 & 111.85 & 137.599 \\ 99.297 & 116.034 & 142.427 \\ 117.321 & 136.795 & 162.866 \end{bmatrix}$$

Matrix of Carey Interference Contour Distances (km)
with 3 dB/Octave correction above 500' elevation:

$$IU = \begin{bmatrix} 74.191 & 95.434 & 130.196 \\ 80.789 & 103.481 & 142.427 \\ 90.767 & 115.873 & 156.75 \\ 99.297 & 126.817 & 169.464 \\ 104.447 & 133.898 & 177.028 \\ 108.47 & 138.887 & 183.305 \\ 130.679 & 161.578 & 212.595 \end{bmatrix}$$

Error Matrix for points up through 500' elevation:
 'Formula calculated distance' - 'Carey Interf Contour Distance' (km):

$$ELL = \begin{bmatrix} 2.904 & 1.08 & -1.948 \\ 2.518 & 0.942 & -1.473 \\ 1.655 & 0.694 & -1.045 \\ 0.515 & 0.659 & 0.004 \\ -0.294 & 0.453 & 0.853 \\ -0.897 & 0.301 & 1.211 \\ -4.223 & -0.151 & 3.725 \end{bmatrix}$$

Standard Deviation of Above Errors: $\sigma = 7.932$ km

A row by row plot of these errors is presented in Fig. D11.

Error Matrix for points above 500' elevation:
 'Formula calculated distance' - Carey Interf w/o Correction' (km):

$$ELU = \begin{bmatrix} -1.045 & 1.661 & 5.648 \\ -0.07 & 3.864 & 8.333 \\ 2.54 & 7.622 & 12.616 \\ 4.803 & 11.148 & 16.219 \\ 6.349 & 13.245 & 17.125 \\ 7.586 & 14.725 & 18.603 \\ 13.115 & 21.778 & 28.76 \end{bmatrix}$$

Error Matrix for points above 500' elevation:
 'Formula calculated distance' - Carey Interf w Correction' (km):

$$EUU = \begin{bmatrix} -7.804 & -12.984 & -23.964 \\ -6.669 & -11.747 & -25.463 \\ -5.024 & -10.242 & -23.916 \\ -3.565 & -9.291 & -23.21 \\ -2.341 & -8.803 & -22.304 \\ -1.587 & -8.127 & -22.274 \\ -0.242 & -3.006 & -20.969 \end{bmatrix}$$

Error Matrix for points above 500' elevation:
 'Formula calculated distance' - 50/50 Weight Average of Carey
 Interf w & w/o Correction' (km):

$$EAU = \begin{bmatrix} -4.424 & -5.662 & -9.158 \\ -3.37 & -3.941 & -8.565 \\ -1.242 & -1.31 & -5.65 \\ 0.619 & 0.928 & -3.496 \\ 2.004 & 2.221 & -2.589 \\ 3 & 3.299 & -1.836 \\ 6.437 & 9.386 & 3.895 \end{bmatrix}$$

Error Matrix for all points from proposed equation re
50/50 weighted Average of Carey Interf w & w/o Correction (km):

$$EA = \begin{bmatrix} 2.904 & 1.08 & -1.948 & -4.424 & -5.662 & -9.158 \\ 2.518 & 0.942 & -1.473 & -3.37 & -3.941 & -8.565 \\ 1.655 & 0.694 & -1.045 & -1.242 & -1.31 & -5.65 \\ 0.515 & 0.659 & 0.004 & 0.619 & 0.928 & -3.496 \\ -0.294 & 0.453 & 0.853 & 2.004 & 2.221 & -2.589 \\ -0.897 & 0.301 & 1.211 & 3 & 3.299 & -1.836 \\ -4.223 & -0.151 & 3.725 & 6.437 & 9.386 & 3.895 \end{bmatrix}$$

Standard Deviation of Above Errors: $\sigma A = 21.633$ km

FCC PROPOSED EQUATION:

Error Matrix for points up through 500' elevation:
 'FCC equation distance' - 'Carey Interf Contour Distance' (km) :

$$EFCCLL = \begin{bmatrix} -1.255 & -1.425 & -0.755 \\ -2.483 & -2.271 & -0.619 \\ -4.674 & -3.658 & -0.783 \\ -7.01 & -4.734 & -0.314 \\ -8.606 & -5.632 & 0.135 \\ -9.81 & -6.315 & 0.177 \\ -16.221 & -9.53 & 0.976 \end{bmatrix}$$

Standard Deviation of Above Errors: $\sigma_{FCC} = 26.837$ km

Error Marix for points above 500; elevation:
 'FCC equation distance' - 'Carey Interf w/o Correction' (km) :

$$EFCCLU = \begin{bmatrix} -0.334 & 2.392 & 9.922 \\ 0.258 & 4.425 & 13.983 \\ 2.215 & 7.885 & 20.462 \\ 3.849 & 11.119 & 26.059 \\ 4.965 & 13.015 & 28.283 \\ 5.866 & 14.337 & 30.77 \\ 9.581 & 20.528 & 46.136 \end{bmatrix}$$

Error Marix for points above 500; elevation:
 'FCC equation distance' - 'Carey Interf w Correction' (km) :

$$EFCCUU = \begin{bmatrix} -7.094 & -12.253 & -19.69 \\ -6.34 & -11.186 & -19.813 \\ -5.349 & -9.979 & -16.071 \\ -4.519 & -9.32 & -13.37 \\ -3.726 & -9.033 & -11.146 \\ -3.308 & -8.516 & -10.107 \\ -3.776 & -4.256 & -3.592 \end{bmatrix}$$

Error Marix for points above 500; elevation:
 'FCC equation distance' - '50/50 Weighted Average of Carey
 Interf w & w/o Correction' (km) :

$$EFCCAU = \begin{bmatrix} -3.714 & -4.931 & -4.884 \\ -3.041 & -3.38 & -2.915 \\ -1.567 & -1.047 & 2.195 \\ -0.335 & 0.899 & 6.344 \\ 0.619 & 1.991 & 8.569 \\ 1.279 & 2.91 & 10.331 \\ 2.902 & 8.136 & 21.272 \end{bmatrix}$$

Error Matrix for all points from FCC equation re
50/50 weighted Average of Carey Interf w & w/o Correction (km):

$$EFCCA = \begin{bmatrix} -1.255 & -1.425 & -0.755 & -3.714 & -4.931 & -4.884 \\ -2.483 & -2.271 & -0.619 & -3.041 & -3.38 & -2.915 \\ -4.674 & -3.658 & -0.783 & -1.567 & -1.047 & 2.195 \\ -7.01 & -4.734 & -0.314 & -0.335 & 0.899 & 6.344 \\ -8.606 & -5.632 & 0.135 & 0.619 & 1.991 & 8.569 \\ -9.81 & -6.315 & 0.177 & 1.279 & 2.91 & 10.331 \\ -16.221 & -9.53 & 0.976 & 2.902 & 8.136 & 21.272 \end{bmatrix}$$

Standard Deviation of Above Errors: $\sigma_{FCCA} = 29.366$ km